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Harvests in various fisheries for salmonids, Atlantic salmon returns to rivers and environmental conditions in Labrador, 2004

Captures dans diverses pêches de salmonidés, remontes de saumons atlantiques dans les rivières et conditions environnementales au Labrador en 2004

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Abstract

This paper summarizes information on subsistence and angling fisheries catch statistics for Labrador in 2004. Environmental data collected at gauging stations as well as the total return information collected from counting facilities are summarized. Subsistence fisheries in Labrador recorded landings of 12,081 Atlantic salmon weighing 31,649 kg, 10,554 Arctic charr weighing 13,739 kg, and 13,029 sea brook trout weighing 10,267 kg. Landings recorded by the angling fishery were 1,825 small salmon retained, 6,529 small salmon released, 258 large salmon retained and 1,646 large salmon released. In general, water levels in northern Labrador were near maximum levels during the beginning of the season into the second week of July and then during most of August. For the reminder of the season water levels were slightly below or above the mean water level. In southern Labrador water levels were average to below average and then low water levels continued well into the fall. Returns of small and large salmon to counting facilities in Labrador are documented.

Résumé

Ce document présente un résumé des statistiques sur les prises des pêches sportives et des pêches de subsistance pratiquées au Labrador en 2004. Les données sur les conditions environnementales recueillies à des stations hydrométriques, ainsi que les renseignements sur les remontes totales fournis par les barrières de dénombrement sont aussi résumés. Les pêcheurs de subsistance ont capturé 12 081 saumons atlantiques (pesant 31 649 kg), 10 554 ombles chevaliers (pesant 13 739 kg) et 13 029 ombles de fontaine (pesant 10 267 kg), tandis que les pêcheurs sportifs ont gardé 1 825 petits saumons et 258 gros saumons et relâché 6 529 petits saumons et 1 646 gros saumons. En général, les niveaux d'eau dans les rivières du Labrador étaient près des niveaux maximaux au début de la saison jusqu'à la deuxième semaine de juillet et, ensuite, pendant une grande partie du mois d'août. Durant le reste de la saison, les niveaux d'eau étaient légèrement inférieurs ou supérieurs à la moyenne. Dans le sud du Labrador, les niveaux étaient moyens ou inférieurs à la moyenne et l'eau est restée à de faibles niveaux jusque tard à l'automne. Les retours de petits et de gros saumons aux barrières de dénombrement du Labrador sont documentés.

INTRODUCTION

In 1992, several major changes were introduced to the management of Atlantic salmon (*Salmo salar* L.) in Newfoundland and Labrador. A five-year moratorium was placed on commercial salmon fishing in the island portion of the province. Quotas for the Labrador commercial fishery, first introduced in 1990, were further reduced and a voluntary retirement of commercial salmon licences was instituted for the entire province. Beginning in 1997, the commercial fishery was closed in the Straits area of Labrador in Salmon Fishing Area (SFA) 14B and then in 1998, it was closed in the remaining SFAs 1 and 2 (Fig. 1). Fishers were offered a buyout which most accepted.

In response to the Supreme Court of Canada decision interpreting Section 35 of the Constitution Act of 1982, the Department of Fisheries and Oceans (DFO) provided resource access to Aboriginal groups for food, social and ceremonial purposes (FSC). In 1999-2004, a FSC or subsistence fishery of 10 tonnes was available for members of the Labrador Inuit Association in the north as well as the Lake Melville area, both located in SFA 1. The Innu Nation also fish for salmon in Lake Melville and from the community of Natuashish. They generally restrict themselves to harvests of around 3 t. Beginning in 2000 and continuing into 2004, residents of Labrador were able to fish in the sea for brook trout (*Salvelinus fontinalis* Mitchill) and Arctic charr (*Salvelinus alpinus* L.) with a permitted bycatch of four salmon. In 2004, members of the Labrador Métis Nation on the south coast of Labrador negotiated a subsistence fishery of 10 t with the Department of Fisheries and Oceans in the area between Fish Cove Point and Cape St. Charles (SFA 2).

The West Greenland commercial salmon fishery, which was closed for the 1993 and 1994 fishing seasons, was re-opened in 1995 and closed again in 1999, leaving only a small subsistence fishery in 2000. In 2001, the commercial Greenland fishery was opened with a structured quota system that depended on abundance based on in-season catches and historical averages to determine potential landings. Although there have been no recent tagging studies to document the distribution of Labrador salmon at sea, some Labrador origin multi-sea winter salmon may be caught in the Greenland fishery similar to what was shown for Labrador stocks in earlier studies by Pratt et al. (1974). In 2002-03, the Greenland fishery was restricted to a local fishery of 22 t and in 2004 it was reduced to a subsistence consumption fishery only, estimated to be around 20 t.

There are also harvests of salmon in the angling fishery in Labrador. In 1992 and 1993, a quota on the number of fish that could be retained was introduced. The quota was assigned for an entire SFA and was not administered on an individual river basis. Only hook-and-release fishing was permitted after the quota was caught. In 1994, quotas for the angling fishery were eliminated. In place of quotas, for Labrador, the season bag limit for retained salmon was lowered from eight to six fish, only two of which could be large salmon. In 1995 and 1996, the season bag limit for the angling fishery remained at six fish but only one large salmon could be retained. In 1999 and 2000, the angling fishery was restricted to a seasonal limit of four salmon retained, one of which could be large, and a daily limit of four salmon could be hooked-and-released. In 1999, use of

barbless hooks became mandatory. In 2001, as part of a 2001-05 Management Plan, several additional rivers in southern Labrador crossed by the new Trans Labrador Highway were added to the list of scheduled rivers and restricted to individual bag limits of two small salmon retained. The Management Plan remains the same in 2004.

The purpose of this paper is to document harvests of salmon in subsistence and angling fisheries and to describe environmental conditions in Labrador in 2004.

METHODS

ANGLING FISHERIES

Catch and effort data from the angling fishery in northern (SFA 1) and southern Labrador (SFA 2) were collected by DFO enforcement staff in conjunction with angling reports submitted by commercial sports camp operators and processed by DFO Science Branch (Fig. 1). Procedures for the collection and compilation of angling and commercial fishery data are described by Ash and O'Connell (1987). For purposes of separating 1SW salmon from 2SW salmon in angling fisheries, small salmon are defined as those salmon less than 63 cm and will be mainly 1SW (grilse) in age. Large salmon are those salmon equal to or greater than 63 cm and will be mainly 2SW and older in age.

In 1994, a new system, viz. the License Stub Return System (LSRS) was initiated for collecting angling statistics in Newfoundland and Labrador. It is based on attaching to the provincial angling licence a detachable stub upon which the angler can record details of where and when the fishing activity took place, and the numbers of salmon caught and released (O'Connell et al. 1998). Because of concerns over a lack of comparability of DFO angling statistics and the LSRS data, Conservation and Protection (C&P) staff and camp operator data will continue to be used for Labrador in SFA 1. For SFA 2, a blend of LSRS and camp operator data was used; whereby camp operator data was used for Eagle and Sand Hill rivers and LSRS data for all other rivers. The retained catches reported by these two methods were similar. For SFA 14B rivers, the catch statistics for 1996-2004 were derived from the License Stub Return System. Tags were issued to anglers that when attached to a salmon could be used to identify legally caught fish.

The Management Plan for the angling fishery in Labrador was as follows:

Season: 15 June - 15 September

Catch limits: four salmon per season, one of which can be large; except on Class III rivers where only two small salmon could be retained for the season

Hook and release limits: four per day

SUBSISTENCE FISHERIES

In 2004, there were four subsistence fisheries harvesting salmonids in Labrador: 1 – LIA (Labrador Inuit Association, presently the Nuvatsiavut Government) members fishing in the northern Labrador coastal communities of Rigolet, Makkovik, Hopedale, Postville, and Nain and in Lake Melville; 2 – Innu Nation members fishing in Natuashish and in Lake Melville from the community of Sheshatshiu; 3 – Labrador residents fishing in Lake Melville and coastal communities in southern Labrador from Cartwright to Cape St. Charles and, 4 – LMN (Labrador Métis Nation) members fishing in southern Labrador from Fish Cove Point to Cape St. Charles. The LIA Innu, and LMN fisheries were self-regulated by Aboriginal Fishery Guardians hired by these groups as well as the Department of Fisheries and Oceans Fishery Officer and Guardian staff. The DFO staff are also responsible for regulating the resident fishery.

For the LIA, LMN and resident fisheries, tags for salmon were issued on an individual, fisher basis to identify legally caught salmon. There is a catch limit on charr and trout combined of 50 fish per designate or license holder. Furthermore, there is a limit of one designate or licence holder per household. Catch statistics were derived from logbooks issued to each fisher. The Innu Nation guardians collected catch statistics by maintaining a daily record of landings per family. Total catches were estimated by adjusting the logbook catches proportionately to the number of fishers reporting out of the total licenced/designated.

A summary of the year 2004 Management Plans for the four subsistence fisheries as they pertain to salmon follows:

LABRADOR INUIT ASSOCIATION

The conditions for the LIA Communal fishery were as follows:

Harvest Limits: an allocation of 10 t of salmon for the season for that portion of coastal Labrador extending from Fish Cove Point, north to Cape Chidley, including Lake Melville (Zone 1)
Seasons: May 14-July 10 and July 20-August 14 in Goose Bay, North West River and Mud Lake, May 14-August 31 in Rigolet, June 1-August 31 in Makkovik and Postville, June 1-September 30 in Hopedale and Nain.

INNU NATION

The Community Guidelines for the Innu Nation fishery were as follows:

Harvest limits: thirty per household with a 1,500 community total for the season. Only 30 fishers or their designates are allowed to fish in Lake Melville for an allocation of 3.0 t and 0.5 t in Natuashish.

Season: mid-June to end of 1st week of August and mid-June to end of July for Sheshatshiu in Lake Melville.

LABRADOR MÉTIS NATION

The conditions for the LMN Communal fishery were as follows:

Harvest limits: An allocation of 10 t permitted to be harvested for the season in the area from Fish Cove Point to Cape St. Charles.
Seasons: July 7-August 15

LABRADOR RESIDENT

The Management Plan for the Labrador Resident fishery was as follows:

Catch limits: four salmon per licence with a limit of 50 trout.

Seasons: July 14-August 2 (Fish Cove Point to Bolsters Rock) and July 14-July 26 (Bolsters Rock to Cape Charles) in southern Labrador, June 15-July 1 and July 24-August 8 in Lake Melville and June 15-July 1 (Cape Rouge to Davis Inlet) and July 2-July 23 (Davis Inlet to Cape Chidley) in northern Labrador.

TOTAL SALMON RETURNS TO RIVERS

Total returns to rivers in Labrador are available for six river systems and one tributary. Total returns have been previously reported by Lowe and Mullins (1996) for Forteau Brook and Mullins and Caines (1998) for Pinware River (updated by Mullins, pers. comm.), by Reddin et al. (1996) for Sand Hill River, by Reddin and Short (2000) for Big Brook, and by Reddin et al. (2000) for English River. In 2002, there was a counting fence in operation on Muddy Bay Brook (Dykes River) for the first time. The counting fence on Southwest Brook, a tributary to Paradise River, was in operation since 1998. However, this counting facility was not in operation in 2000. Muddy Bay Brook and Southwest Brook returns were reported for 2002-04 by Reddin et al. (2005). Total returns to rivers include counts at counting fence traps plus downstream angling catches as well as estimates of hook and release mortalities, which are assessed at 10% of the number of salmon hooked and released.

ENVIRONMENTAL DATA

Environmental data consisting of water flow conditions are collected annually from a system of gauging stations set on various rivers which are operated by Environment Canada. Several of these stations have automated data collection platforms with provision for downloading data via satellite. The Province of Newfoundland and Labrador through the Department of Environment and Labour is responsible for

downloading the data and provides it in near-real time; albeit with no quality control. Data are archived by Environment Canada after quality control and made available from the Environment Canada Hydat CD-Rom for the period of record up to and including 1997. Flow data from Alexis, Eagle, Naskaupi, and Ugjoktok, rivers were selected to be representative of conditions on Labrador salmon rivers in 2004.

RESULTS AND DISCUSSION

ANGLING SALMON FISHERY DATA

In SFA 1, the total catch (small and large salmon combined) of 1,874 increased over 2003 by 16% (Table 1). In SFA 2, the total catch of 6,027 was greater than 2003 by 24% (Table 2). In SFA 14B, the total catch of 2,357 was 13% higher than in 2003 (Table 3). In 2004, the total Labrador angling catch in all SFAs was 10,258 salmon including hooked and released fish which was 20% higher than levels experienced in 2003 and previous years excluding 2000 with a total catch of 11,364 (Table 4). The catch of small salmon was 8,354 (1,825 retained and 6,529 released) and large salmon was 1,904 (258 retained and 1,646 released). The proportion of salmon released by anglers in Labrador, which has been increasing in recent years, was 80% of the total catch. In total, there were 8,175 small and large salmon reported to have been hooked and released in 2004 (Tables 1-4).

SUBSISTENCE FISHERIES DATA

In 2004, the following landings of salmon were reported for the subsistence fisheries in Labrador:

	Small salmon		Large salmon		Total	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
SFA 1	4,821	10,038	2,210	8,656	7,031	18,694
SFA 2	3,481	7,166	1,450	5,480	5,050	12,955
TOTAL	8,302	17,204	3,660	14,136	12,081	31,649

In total, there were about 12,081 salmon reported by subsistence fisheries in Labrador with a total weight of about 31,649 kg. Reporting rates for the various fisheries were 86% for the LIA fishery in Lake Melville and northern Labrador, 83% for the Innu Nation fishery in Sheshatshiu, 96% for the resident fishery in Lake Melville, northern and southern Labrador, and 80% for the LMN fishery. Food fishery landings of small and large salmon in Labrador are listed in Table 5 for those years of available data.

In 2004, landing information is also available for charr and trout from the Resident, LIA and Innu Fisheries:

	Charr		Trout	
	Number	Weight (kg)	Number	Weight (kg)
SFA 1	6,282	8,924	8,363	6,547
SFA 2	4,272	4,815	4,666	3,720
Total	10,554	13,739	13,029	10,267

In total, there were 10,554 charr with a total weight of 13,739 kg and 13,029 brook trout with a total weight of 10,267 kg reported in the fisheries in Lake Melville (SFA 1), northern (SFA 1) and southern Labrador (SFA 2) in 2004 during the open water fishing season. The total numbers of charr and trout landed in Labrador are unknown as there is no reporting system for fish caught either through the ice in the winter/spring or by recreational fishing in summer. Food fishery landings of charr and trout in Labrador are listed in Table 6 for those years of available data.

TOTAL RETURNS TO RIVERS

Total returns of small and large salmon to rivers in Labrador with counting facilities are listed in Table 7 for those years of available data. On the rivers with time series information, declines were observed for small and large salmon on Forteau Brook (1994-97), increasing small and large salmon for Sand Hill River (1970-73, 1994-96 and 2002-04) and increasing trends for small and large salmon at Southwest Brook (Paradise River, 1998-99 and 2001-04). Muddy Bay Brook is showing an increased trend in the number of small salmon. Returns of small and large salmon show a declining trend at English River (1999-2004); whereas, the number of small salmon increased while the number of large salmon decreased at Sand Hill River when compared with 2003. Small and large salmon have increased on Southwest Brook compared to all previous counts. At Muddy Bay Brook, there were 454 small salmon and 28 large salmon. Small salmon increased at Muddy Bay Brook over previous years and large salmon decreased from the 2003. The numbers of small salmon decreased at the English River and the number of large salmon decreased over all years excluding 2000 and 2003.

ENVIRONMENTAL DATA

Daily water flow rates on Alexis River at the beginning of June in 2004 were similar to the mean daily flows, increasing to below maximum flows at the end of the first week in June. The daily flow rate then continued to decrease to mean flow rates and at the end of June to minimum levels where it stayed into September, excluding two events throughout the summer when water levels again rose to mean levels. The rising water events took place during the first week and near the last week of August. On June 1, daily water flows on Eagle River in 2004 were slightly below the mean for daily water flows. The water flow rates continued to decline remaining similar to the average for the remainder of the season. The water flows were between mean and minimum water flow levels at the end of July and during the beginning of September began decreasing to minimum levels into the fall (Fig. 3). On June 1, daily flow conditions on Ugjoktok

River in 2004 were increasing to maximum flows and remained there until the second week in June where it declined sharply to above mean levels until the beginning of July when there were a couple of spates in water levels which remained below the maximum but above the mean during the first two weeks. Water levels then declined to below the mean levels by the end of July. During the first two weeks in August, water flow rates began to increase to above maximum levels and then slowly decreased to slightly above minimum levels nearing the second week of September when the water levels began to rise again to slightly above mean water levels for the remainder of the month of September (Fig. 4). The daily water flow rates for the Naskaupi River show an increase from the beginning of June to mid-June with water levels reaching maximum heights, and then decreasing steadily until the first week in July to mean levels. Water levels continue to slowly decrease to slightly above minimum levels at the beginning of August. Next, the water levels began to rise slowly to above mean levels but below maximum level until the third week in August. Water levels then decrease to above the minimum water level increasing slightly during the second week in September and remaining below the mean into the Fall.

SALMON RIVERS IN LABRADOR

Anderson (1985) lists 120 rivers in Labrador from the southern border with Quebec to Cape Chidley. A summary is provided here along with estimates of rearing and drainage areas for all salmon rivers in Labrador including some omitted by Anderson (1985). There are some rivers that were left out of this list, i.e. Barge Bay Brook, and Southwest Tributary of White Bear River that will be added in the future as more information becomes available. Of these, there currently are about 77 rivers with salmon that have a drainage area bigger than about 50 km^2. Some of these rivers have only salmon in them whereas others have a mix of salmon, brook trout and Arctic charr. The survey information from these rivers if available are detailed in Table 8.

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REFERENCES

Anderson, T. C. 1985. The rivers of Labrador. Can. Spec. Publ. Fish. Aquat. Sci. 81: 389 p.

Ash, E. G. M., and O'Connell, M. F. 1987. Atlantic salmon fishery in Newfoundland and Labrador, commercial and recreational, 1985. Can. Data Rep. Fish. Aquat. Sci. 672: v + 284 p.

Lowe, S. L., and Mullins, C. C. 1996. Status of Atlantic salmon (*Salmo salar* L.) stock on the Forteau River, 1995. DFO, Atlantic Fisheries Research Document. 96/87, 31 p.

Mullins, C. C., and Caines, D. 1998. Status of Atlantic salmon (*Salmo salar* L.) stock of Pinware River, Labrador, 1997. DFO, Can. Sto. Assess. Sec. Res. Doc. 98/116, 37 p.

Murphy, H. P. 1971. A helicopter reconnaissance survey of Eagle, Paradise, and White Bear Rivers, Sandwich Bay, Labrador, August 1970. Fish. Serv. Res. Dev. Branch Nfld. Reg. Prog. Rep. 83: v + 53 p.

Murphy, H. P. 1972. A helicopter reconnaissance survey of 21 Labrador rivers, August-September, 1971. Fish. Serv. Res. Dev. Branch Nfld. Reg. Prog. Rep. 95: xi + 164 p.

Murphy, H. P. 1973. A helicopter reconnaissance survey of 17 Labrador rivers, August 1972. Fish. Serv. Res. Dev. Branch Nfld. Reg. Prog. Rep. 101: xi + 177 p.

Murphy, H. P., and Porter, T. R. 1974. Stream surveys of 31 rivers of Labrador. Vol. I: English River to Fraser River. Fish. Mar. Serv. Res. Dev. Branch Nfld. Reg. Intern. Rep. Ser. No. NEW/1-74-8: vii + 141 p.

O'Connell, M. F., Cochrane, N. M., Ash, E. G. M., and Mullins, C. C. MS 1998. An analysis of the License Stub Return System in the Newfoundland Region, 1994-97. DFO, Can. Sto. Assess. Sec. Res. Doc. 98/111, 67 p.

Peet, R. F. 1971. A report on the counting trap and reconnaissance surveys conducted in central coastal Labrador during 1967. Fish. Serv. Res. Dev. Branch Nfld. Reg. Prog. Rep. 68: xiv + 286 p.

Pratt, J. D., Hare, G. M., and Murphy, H. P. 1974. Investigations of production and harvest of an Atlantic salmon population, Sandhill River, Labrador. Fish. Mar. Serv. Res. Dev. Branch Nfld. Reg. Tech. Rep. Ser. No. NEW/ T-74-1: iii + 27 p.

Reddin, D. G., Poole, R. J., Brown, V., and Lethbridge, R. 2005. Salmonid returns to Southwest Brook (Paradise River) and Muddy Bay Brook, Labrador in 2002-2004. DFO, Can. Sci. Advis. Sec. Res. Doc. 2005/063. 41 p.

Reddin, D. G., Short, P. B., O'Connell, M. F., and Walsh, A. D. 1996. Atlantic salmon stock status for Sand Hill River, Labrador, 1995. DFO, Atlantic Fisheries Res. Doc. 96/82. 32 p.

Reddin, D. G., Short, P. B., Sheppard, G., and Lowe, S. 2000. The stock status of Atlantic salmon (*Salmo salar* L.) in English River, Labrador, 1999. DFO, Can. Sto. Assess. Sec. Res. Doc. 2000/046, 20 p.

Reddin, D. G., and Short, P. B. 2000. The stock status of Atlantic salmon (*Salmo salar* L.) in Big Brook (Michaels River), Labrador, 1999. DFO, Can. Sto. Assess. Sec. Res. Doc. 2000/045, 32 p.

Riche, L. G. 1965. A preliminary biological survey of the Naskaupi, Kenamu and Lower Churchill rivers. Dep. Fish. Can. Fish. Cult. Dev. Branch Nfld. Prog. Rep. 30: vi + 82 p.

Table 1. Atlantic salmon recretational fishery catch and effort data for Salon Fishing Area 1, Labrador, 1974-2004.
Ret. = retained fish; Rel. = released fish.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Total	Ret.	Rel.	Total	Ret.	Rel.	Total	CPUE
1974	801	347	.	347	311	.	311	658	.	658	0.82
1975	245	379	.	379	117	.	117	496	.	496	2.02
1976	922	891	.	891	368	.	368	1259	.	1259	1.37
1977	809	688	.	688	533	.	533	1221	.	1221	1.51
1978	704	875	.	875	432	.	432	1307	.	1307	1.86
1979	1367	905	.	905	430	.	430	1335	.	1335	0.98
1980	780	704	.	704	232	.	232	936	.	936	1.20
1981	422	669	.	669	195	.	195	864	.	864	2.05
1982	831	834	.	834	379	.	379	1213	.	1213	1.46
1983	834	488	.	488	137	.	137	625	.	625	0.75
1984	1074	702	.	702	222	.	222	924	.	924	0.86
1985	946	642	.	642	135	.	135	777	.	777	0.82
1986	741	421	.	421	129	.	129	550	.	550	0.74
1987	1011	854	.	854	141	.	141	995	.	995	0.98
1988	1629	1278	.	1278	171	.	171	1449	.	1449	0.89
1989	1296	1269	.	1269	144	.	144	1413	.	1413	1.09
1990	1245	563	.	563	115	.	115	678	.	678	0.54
1991	1056	130	.	130	8	.	8	138	.	138	0.13
1992	899	283	29	312	335	0	335	618	29	647	0.72
1993	422	121	124	245	22	25	47	143	149	292	0.69
1994	1036	453	933	1386	114	96	210	567	1029	1596	1.54
1995	880	500	854	1354	92	97	189	592	951	1543	1.75
1996	879	260	62	322	50	17	67	310	79	389	0.44
1997	1266	300	133	433	46	25	71	346	158	504	0.40
1998	813	256	448	704	61	109	170	317	557	874	1.08
1999	954	350	353	703	109	97	206	459	450	909	0.95
2000	1103	363	801	1164	79	232	311	442	1033	1475	1.34
2001	962	352	681	1033	75	130	205	427	811	1238	1.29
2002	651	129	482	611	28	140	168	157	622	779	1.20
2003	1032	174	777	951	36	633	669	210	1410	1620	1.57
2004	768	116	1152	1268	24	582	606	140	1734	1874	2.44

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.

CPUE IS BASED ON RETAINED + RELEASED FISH FOR 1992-2004 AND ON RETAINED FISH ONLY PRIOR TO 1992.

Table 2. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 2, Labrador, 1974-2004.
Ret. = retained fish; Rel = released fish. DFO data from 1974 to 1993 and Licence Stub Return System from 1994 to 2004.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Total	Ret.	Rel.	Total	Ret.	Rel.	Total	CPUE
1974	1978	1414	.	1414	201	.	201	1615	.	1615	0.82
1975	1784	2524	.	2524	56	.	56	2580	.	2580	1.45
1976	2331	2337	.	2337	152	.	152	2489	.	2489	1.07
1977	2507	2244	.	2244	160	.	160	2404	.	2404	0.96
1978	3131	1243	.	1243	152	.	152	1395	.	1395	0.45
1979	1817	2312	.	2312	60	.	60	2372	.	2372	1.31
1980	1692	2158	.	2158	320	.	320	2478	.	2478	1.46
1981	1423	2824	.	2824	105	.	105	2929	.	2929	2.06
1982	2290	1999	.	1999	162	.	162	2161	.	2161	0.94
1983	2294	1884	.	1884	161	.	161	2045	.	2045	0.89
1984	2057	1246	.	1246	103	.	103	1349	.	1349	0.66
1985	1756	1367	.	1367	59	.	59	1426	.	1426	0.81
1986	2310	1972	.	1972	154	.	154	2126	.	2126	0.92
1987	2750	2625	.	2625	277	.	277	2902	.	2902	1.06
1988	2875	2653	.	2653	288	.	288	2941	.	2941	1.02
1989	2986	2242	.	2242	264	.	264	2506	.	2506	0.84
1990	2607	1680	.	1680	144	.	144	1824	.	1824	0.70
1991	2427	1041	.	1041	36	.	36	1077	.	1077	0.44
1992	2813	1599	158	1757	208	10	218	1807	168	1975	0.70
1993	3600	1340	1255	2595	114	36	150	1454	1291	2745	0.76
1994	3296	1437	2242	3679	263	201	464	1700	2443	4143	1.26
1995	3221	1232	2005	3237	234	256	490	1466	2261	3727	1.16
1996	3966	1405	2591	3996	210	324	534	1615	2915	4530	1.14
1997	3688	1335	1293	2628	112	123	235	1447	1416	2863	0.78
1998	3941	1011	2201	3212	170	354	524	1181	2555	3736	0.95
1999	4529	1329	3229	4558	211	496	707	1540	3725	5265	1.16
2000	5332	1480	4169	5649	183	461	644	1663	4630	6293	1.18
2001	4635	1151	2984	4135	263	891	1154	1414	3875	5289	1.14
2002	4754	1328	3050	4378	179	377	556	1507	3427	4934	1.04
2003	3885	1274	3022	4296	186	398	584	1460	3420	4880	1.26
2004	4786	1216	3877	5093	234	700	934	1450	4577	6027	1.26

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED + RELEASED FISH FOR 1992-2004 AND ON RETAINED FISH ONLY PRIOR TO 1992.
2004 - DATA PRELIMINARY
**COMBINATION OF LICENSE STUB, DFO AND CAMP DATA. (1974-1993 IS DFO AND CAMP DATA ONLY)

Table 3. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 14B, Labrador, 1974-2004. Ret. = retained fish; Rel. = released fish. DFO data from 1974 to 1993 and Licence Stub Return System from 1994 to 2004.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Total	Ret.	Rel.	Total	Ret.	Rel.	Total	CPUE
1974	2713	740	.	740	291	.	291	1031	.	1031	0.38
1975	2180	1069	.	1069	154	.	154	1223	.	1223	0.56
1976	3896	2498	.	2498	310	.	310	2808	.	2808	0.72
1977	3918	1662	.	1662	593	.	593	2255	.	2255	0.58
1978	2413	573	.	573	183	.	183	756	.	756	0.31
1979	2149	901	.	901	119	.	119	1020	.	1020	0.47
1980	2476	938	.	938	337	.	337	1275	.	1275	0.51
1981	3353	1698	.	1698	220	.	220	1918	.	1918	0.57
1982	3279	1271	.	1271	80	.	80	1351	.	1351	0.41
1983	3529	2000	.	2000	130	.	130	2130	.	2130	0.60
1984	3997	987	.	987	185	.	185	1172	.	1172	0.29
1985	3664	1092	.	1092	100	.	100	1192	.	1192	0.33
1986	4643	1071	.	1071	184	.	184	1255	.	1255	0.27
1987	4993	1887	.	1887	215	.	215	2102	.	2102	0.42
1988	5707	1592	.	1592	251	.	251	1843	.	1843	0.32
1989	4895	1173	.	1173	53	.	53	1226	.	1226	0.25
1990	5075	1066	.	1066	98	.	98	1164	.	1164	0.23
1991	4017	1152	.	1152	49	.	49	1201	.	1201	0.30
1992	4630	856	64	920	238	0	238	1094	64	1158	0.25
1993	5296	1047	414	1461	242	30	272	1289	444	1733	0.33
1994**	4117	659	506	1165	78	50	128	737	556	1293	0.31
1995**	3618	761	443	1204	82	155	237	843	598	1441	0.40
1996**	4348	900	1123	2023	74	148	222	974	1271	2245	0.52
1997**	3440	730	761	1491	*	418	418	730	1179	1909	0.55
1998**	3534	864	1109	1973	*	351	351	864	1460	2324	0.66
1999**	2109	397	825	1222	*	338	338	397	1163	1560	0.74
2000**	4210	718	2125	2843	*	753	753	718	2878	3596	0.85
2001**	2389	546	975	1521	*	447	447	546	1422	1968	0.82
2002**	3346	614	1520	2134	*	461	461	614	1981	2595	0.78
2003**	3136	664	1125	1789	*	295	295	664	1420	2084	0.66
2004**	3620	493	1500	1993	*	364	364	493	1864	2357	0.65

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED + RELEASED FISH FOR 1992-2004 AND ON RETAINED FISH ONLY PRIOR TO 1992.
*NOT ALLOWED TO RETAIN LARGE SALMON IN SFA 14B, 1997-2004.
**DATA OBTAINED FROM THE LICENSE STUB RETURN (2004 DATA ARE PRELIMINARY).

Table 4. Atlantic salmon recreational fishery catch and effort data for Labrador (SFA 1, 2, and 14B), 1974-2004. Ret. = retained fish; Rel = released fish. DFO data from 1974 to 1993 and Licence Stub Return System from 1994 to 2004.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Total	Ret.	Rel.	Total	Ret.	Rel.	Total	CPUE
1974	5492	2501	.	2501	803	.	803	3304	.	3304	0.60
1975	4209	3972	.	3972	327	.	327	4299	.	4299	1.02
1976	7149	5726	.	5726	830	.	830	6556	.	6556	0.92
1977	7234	4594	.	4594	1286	.	1286	5880	.	5880	0.81
1978	6248	2691	.	2691	767	.	767	3458	.	3458	0.55
1979	5333	4118	.	4118	609	.	609	4727	.	4727	0.89
1980	4948	3800	.	3800	889	.	889	4689	.	4689	0.95
1981	5198	5191	.	5191	520	.	520	5711	.	5711	1.10
1982	6400	4104	.	4104	621	.	621	4725	.	4725	0.74
1983	6657	4372	.	4372	428	.	428	4800	.	4800	0.72
1984	7128	2935	.	2935	510	.	510	3445	.	3445	0.48
1985	6366	3101	.	3101	294	.	294	3395	.	3395	0.53
1986	7694	3464	.	3464	467	.	467	3931	.	3931	0.51
1987	8754	5366	.	5366	633	.	633	5999	.	5999	0.69
1988	10211	5523	.	5523	710	.	710	6233	.	6233	0.61
1989	9177	4684	.	4684	461	.	461	5145	.	5145	0.56
1990	8927	3309	.	3309	357	.	357	3666	.	3666	0.41
1991	7500	2323	.	2323	93	.	93	2416	.	2416	0.32
1992	8342	2738	251	2989	781	10	791	3519	261	3780	0.45
1993	9318	2508	1793	4301	378	91	469	2886	1884	4770	0.51
1994	8449	2549	3681	6230	455	347	802	3004	4028	7032	0.83
1995	7719	2493	3302	5795	408	508	916	2901	3810	6711	0.87
1996	9193	2565	3776	6341	334	489	823	2899	4265	7164	0.78
1997	8394	2365	2187	4552	158	566	724	2523	2753	5276	0.63
1998	8288	2131	3758	5889	231	814	1045	2362	4572	6934	0.84
1999	7592	2076	4407	6483	320	931	1251	2396	5338	7734	1.02
2000	10645	2561	7095	9656	262	1446	1708	2823	8541	11364	1.07
2001	7986	2049	4640	6689	338	1468	1806	2387	6108	8495	1.06
2002	8751	2071	5052	7123	207	978	1185	2278	6030	8308	0.95
2003	8053	2112	4924	7036	222	1326	1548	2334	6250	8584	1.07
2004	9174	1825	6529	8354	258	1646	1904	2083	8175	10258	1.12

Table 5. Total salmon food fishery landings adjusted by subarea for non-reporting and non-used licences, 1999-2004.

	Small salmon		Large salmon		Total	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
SFA 1						
1999	2,739	5,580	1,084	4,220	3,824	9,800
2000	4,111	8,111	1,092	4,365	5,203	12,474
2001	3,394	6,995	1,299	5,121	4,708	12,117
2002	3,609	7,386	1,015	4,441	4,624	11,827
2003	4,382	9,094	1,639	7,026	6,021	16,120
2004	4,822	10,038	2,210	8,656	7,032	18,694
SFA 2						
1999	-	-	-	-	-	-
2000	1,212	2,242	260	897	1,472	3,139
2001	1,396	2,793	374	1,378	1,770	4,172
2002	2,197	4,196	422	1,549	2,619	5,745
2003	2,095	4,102	536	1,885	2,632	5,987
2004	3,480	7,166	1,450	5,480	5,050	12,852
All areas						
1999	2,739	5,580	1,084	4,220	3,824	9,800
2000	5,323	10,353	1,352	5,262	6,675	15,613
2001	4,789	9,789	1,673	6,499	6,478	16,288
2002	5,806	11,581	1,437	5,990	7,243	17,572
2003	6,477	13,196	2,175	8,912	8,653	22,108
2004	8,302	17,204	3,660	14,136	12,081	31,649

Table 6. All trout and charr food fishery landings adjusted by subarea for non-reporting and non-used licences, 2001-2004.

	Charr		Trout		Total (Charr + Trout)	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
SFA 1						
2001	4,226	6,092	12,122	9,568	16,348	15,660
2002	7,175	13,442	10,567	9,816	17,742	23,258
2003	6,574	9,726	8,028	6,355	14,602	16,081
2004	6,282	8,924	8,363	6,547	14,644	15,471
SFA 2						
2001	5,147	5,156	10,467	7,647	15,614	12,803
2002	7,126	6,994	10,861	8,774	17,987	15,768
2003	5,043	5,322	6,410	5,264	11,453	10,586
2004	4,272	4,815	4,666	3,720	8,939	8,535
All areas						
2001	9,373	11,248	22,589	17,215	31,962	28,463
2002	14,301	20,436	21,428	18,590	35,729	39,026
2003	11,616	15,048	14,438	11,619	26,055	26,668
2004	10,554	13,739	13,029	10,267	23,583	24,006

Table 7. Summary of total returns to rivers in Labrador. Total returns include angling catches below counting facilities plus count from counting fence or mark-recapture population estimate.

	Forteau Brook		Pinware River		Sand Hill River		Paradise River & Southwest Brook				Muddy Bay Brook		Big Brook		English River	
Year	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large
1970					3600	138										
1971					3596	266										
1972					2038	175										
1973					4761	504										
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1994	458	77			2180	730										
1995	461	147			2796	560										
1996					3319	414										
1997	223	56	874	179									530	104		
1998									110	4						
1999							4681	491	331	43			790	194	59	48
2000													982	151	367	15
2001									321	32					224	41
2002					3155	567			235	34	106	11			190	31
2003					3157	621			158	16	394	31			133	19
2004					4108	605			615	54	454	28			56	25

Table 8. Drainage areas, parr habitat and potential adult production for Labrador rivers including references. Numbers in bold type are estimated from SFA totals. [1] indicates that drainage basin has been re-surveyed and is different than in Anderson (1985). Rivers in bold and Italic have angling data for some years but not all years.

No.	River	SFA	Region	Total Watershed Drainage (km^2)		Parr rearing habitat			Reference
				Total	Accessible	Accessible (units)	Inaccessible (units)	Potential adult production	
1	***Forteau Brook***	14B	Straits shore	389	324	5515	1097	5000	1, 13
2	***Lance aux Loup Brook***	14B	Straits shore	130	94	936	359	281	1
3	***Pinware River***	14B	Straits shore	2636	2140	46691	10808	14007	1, 2, 14
4	Wiseman Brook	14B	Straits shore	14	14	***291***	***0***	***87***	0,2
5	Black Bay Brook	14B	Straits shore	79	79	***1641***	***0***	***492***	0,2
6	Temple Brook	2	Southern	181	136	2311	***940***	693	1
7	St. Peters River	2	Southern	140	16	65	510	20	1
	Subtotal SFA 14B	**14B**	**Straits shore**	**3569**	**2803**	**57450**	**13714**	**20581**	
8	***St. Charles River*** [1]	2	Southern	321	321	6237	0	1871	2,1
9	***Mary's Hr River*** [1]	2	Southern	458	458	6526	0	1958	2,1
10	Hoop Pole Brook [1]	2	Southern	58	58	***831***	***0***	***249***	0,2
11	***St. Lewis River*** [1]	2	Southern	2428	673	13723	35814	4117	2,1
12	Port Marnham Brook [1]	2	Southern	142	142	***2035***	***0***	***611***	0,2
13	Deer Harbour [1]	2	Southern	84	84	***1204***	***0***	***361***	0,2
14	Notleys Brook	2	Southern	49	49	***702***	***0***	***211***	0,2
15	Bobbys Brook	2	Southern	245	167	1360	641	408	1
16	Black Water Brook	2	Southern	135	135	1935	0	580	2,0
17	***Alexis River*** [1]	2	Southern	3112	912	8919	21522	2676	2,1
18	***Shinneys Waters*** [1]	2	Southern	202	202	1020	0	306	2,1
19	***Gilbert River*** [1]	2	Southern	594	0	0	3238	0	2,5
20	***Brook of St. Michael's Bay***	2	Southern	50	50	***713***	***0***	***214***	0,2
21	Southwest Brook (River 14)	2	Southern	98	98	2128	0	638	5
22	***White Bear Arm River***	2	Southern	233	233	4053	0	1216	5
23	Peters Brook (River 16)	2	Southern	45	45	833	0	250	5
24	***Hawke River***	2	Southern	1891	1891	46366	0	13910	5
25	Caplin Bay Brook	2	Southern	150	150	1591	0	477	5
26	Partridge Bay Brook	2	Southern	70	70	872	0	262	5
27	Shoal Bay River 20	2	Southern	119	119	1067	0	320	5
28	Shoal Bay Brook	2	Southern	18	18	581	0	174	5
29	River 22	2	Southern	13	13	340	0	102	5
30	Black Bear River	2	Southern	645	645	7921	0	2376	5
31	Open Bay Brook	2	Southern	39	39	360	0	108	5
32	Porcupine Harbour River	2	Southern	155	33	368	1381	110	5

Cont'd.

Table 8 Cont'd.

33	River 26	2	Southern	70	70	252	0	76	5
34	Reeds Pond Brook	2	Southern	233	233	3175	0	953	5
35	***Sand Hill River*** [1]	2	Southern	1603	1509	53154	5503	***15946***	9
36	Muddy Bay Brook [1]	2	Southern	344	261	***3741***	***1190***	***1122***	2,8
37	Paradise River [1]	2	Southern	5778	5778	56425	0	16928	2,6
38	***Eagle River***	2	Southern	10824	9793	111516	***5576***	***33456***	5,6
39	Southwest Brook	2	Southern	525	525	***7525***	***0***	***2257***	0
40	***White Bear River***	2	Southern	1021	1021	22228	0	6668	6,1
41	North River [1]	2	Southern	2215	2215	***31748***	***0***	***9524***	8
	Subtotal SFA 2	**2**	**Southern**	**33967**	**28008**	**401450**	**74864**	**120437**	
42	Flatwater Brook	1A	Lake Melville	299	299	***5966***	***0***	***1790***	8
43	English River	1A	Lake Melville	640	33	662	12286	199	3
44	Kenemich River	1A	Lake Melville	699	699	11570	0	3471	3
45	Kenamu River	1A	Lake Melville	4403	4403	***87856***	***0***	16500	10
46	Traverspine River	1A	Lake Melville	728	613	19749	3714	5925	3
47	Churchill River	1A	Lake Melville	93415	1062	***21191***	***1842783***	***6357***	0,11
48	Goose River	1A	Lake Melville	3432	1938	33560	25865	10068	4
49	Cape Caribou River	1A	Lake Melville	546	546	14922	0	4477	3
50	Beaver River	1A	Lake Melville	1878	1624	46251	7245	13875	3
51	Susan River	1A	Lake Melville	363	363	11166	0	3350	3
52	Naskaupi River	1A	Lake Melville	12691	1269	***25323***	***227909***	***7597***	1,9
53	Crooked River	1A	Lake Melville	2391	2391	46836	0	14051	3
54	Sebaskachu River	1A	Lake Melville	580	580	1893	0	568	3
55	Mulligan River	1A	Lake Melville	1062	1062	9902	0	2971	5
	Subtotal SFA 1A			**123127**	**16881**	**336847**	**2119802**	**91199**	
56	***Double Mer***	1B	Northern	1425	1425	19502	0	5851	5
57	Partridge Point Brook (River 49)	1B	Northern	855	855	18635	0	5591	5
58	***Tom Luscombe Brook***	1B	Northern	1010	1010	***15831***	***0***	***4749***	8
59	West Brook	1B	Northern	149	149	***2335***	***0***	***701***	8
60	Middle Brook	1B	Northern	323	323	***5063***	***0***	***1519***	8
61	53/54 Pottles Bay River	1B	Northern	135	135	***2116***	***0***	***635***	8
62	55 Byron Bay River	1B	Northern	163	163	***2555***	***0***	***766***	0
63	***Big Brook (Michaels River)***	1B	Northern	793	793	22059	0	6618	4
64	Jeanette Bay Brook	1B	Northern	67	67	1523	0	457	4
65	River 58	1B	Northern	13	13	***204***	***0***	***61***	0
66	Tukialik River	1B	Northern	47	47	684	0	205	4
67	Pamiulik River	1B	Northern	493	493	14882	0	4465	4

Cont'd.

Table 8 (Cont'd.)

68	Stag Bay Brook	1B	Northern	155	155	4760	0	1428	4
69	Rattling Brook	1B	Northern	285	285	11308	0	3392	4
70	***Big River***	1B	Northern	2849	2849	10879	0	3264	4
71	Adlavik River	1B	Northern	233	233	7186	0	2156	4
72	River 65	1B	Northern	39	39	533	0	160	4
73	River 66	1B	Northern	29	29	***455***	***0***	***136***	7
74	Makkovik Brook	1B	Northern	111	90	2179	520	654	4
75	Makkovik River	1B	Northern	259	259	5231	0	1569	4
76	South Brook	1B	Northern	399	399	3270	0	981	4
77	Kaipokok River	1B	Northern	2499	2242	24006	2756	7202	4
78	English River	1B	Northern	545	125	2686	6087	3032	4,12
79	River 72	1B	Northern	399	399	840	0	252	4
80	Kanairiktok River	1B	Northern	12274	0	0	133109	0	4
81	Little Bay River	1B	Northern	244	244	***3824***	***0***	***1147***	0
82	River 75	1B	Northern	475	475	***7445***	***0***	***2234***	0
83	***Adlatok (Ugjoktok) River***	1B	Northern	11106	8070	130000	48918	39000	4
84	***Hunt River***	1B	Northern	1344	1344	24657	0	7397	3
85	River 78	1B	Northern	338	338	***5298***	***0***	***1589***	0
86	***Flowers River***	1B	Northern	1443	1443	29084	0	8725	3
87	Rivers 80/81	1B	Northern	310	310	***4859***	***0***	***1458***	0
88	Sango Brook	1B	Northern	806	685	15561	2745	4668	0
	Subtotal SFA 1B			**41615**	**25485**	**399449**	**194135**	**122062**	
	Total			**202278**	**73178**	**1195196**	**2402516**	**354279**	

0 No habitat or obstructions surveys assumed 100% accessible
1 Anderson (1985)
2 Kelly (2003)
3 Murphy & Porter (1974)
4 Murphy (1973)
5 Murphy (1972)
6 Murphy (1971)
7 Murphy obstructions survey (unpublished)
8 Peet (1971)
9 Reddin 1997 (unpublished data)
10 Riche (1965)
11 Nf Hydro Survey
12 English River project survey data
13 Lowe & Mullins 1996 CSAS Res. Doc. 96/87
14 Mullins & Caines 1998 CSAS Res. Doc. 98/116

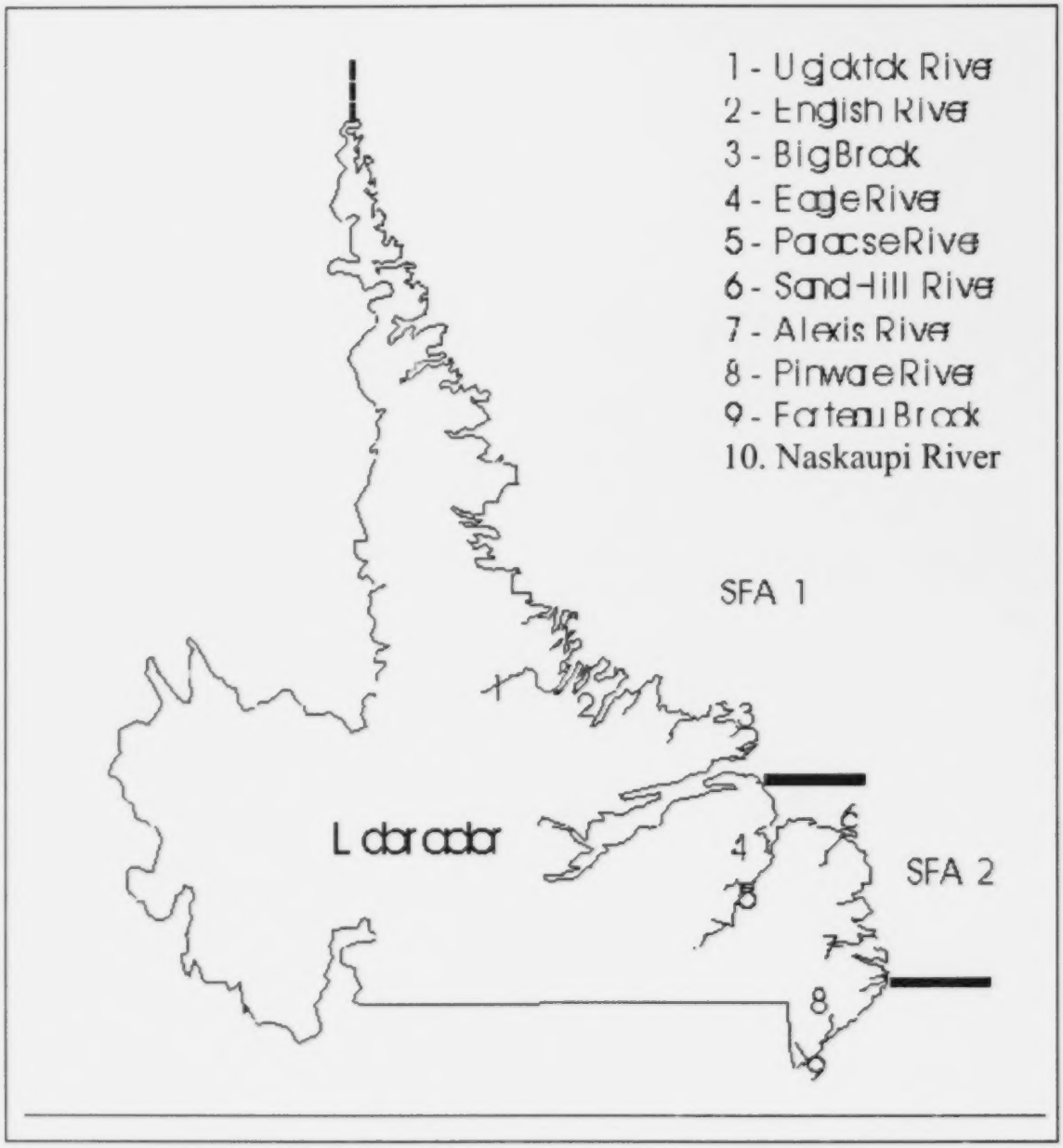

Figure 1. Labrador showing locations of Salmon Fishing Areas and rivers mentioned in the text.

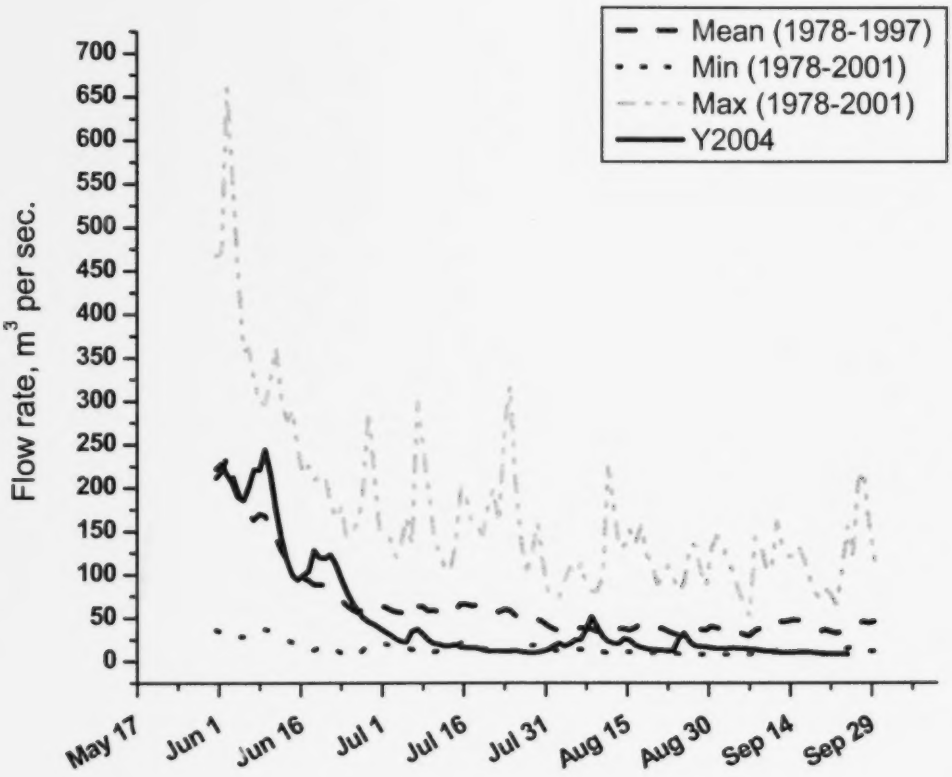

Figure 2. Flow rates for Alexis River indicating mean flows for 1978-97, minimum and maximum flow for 1978-2001 with a comparison to the flow rates in 2004.

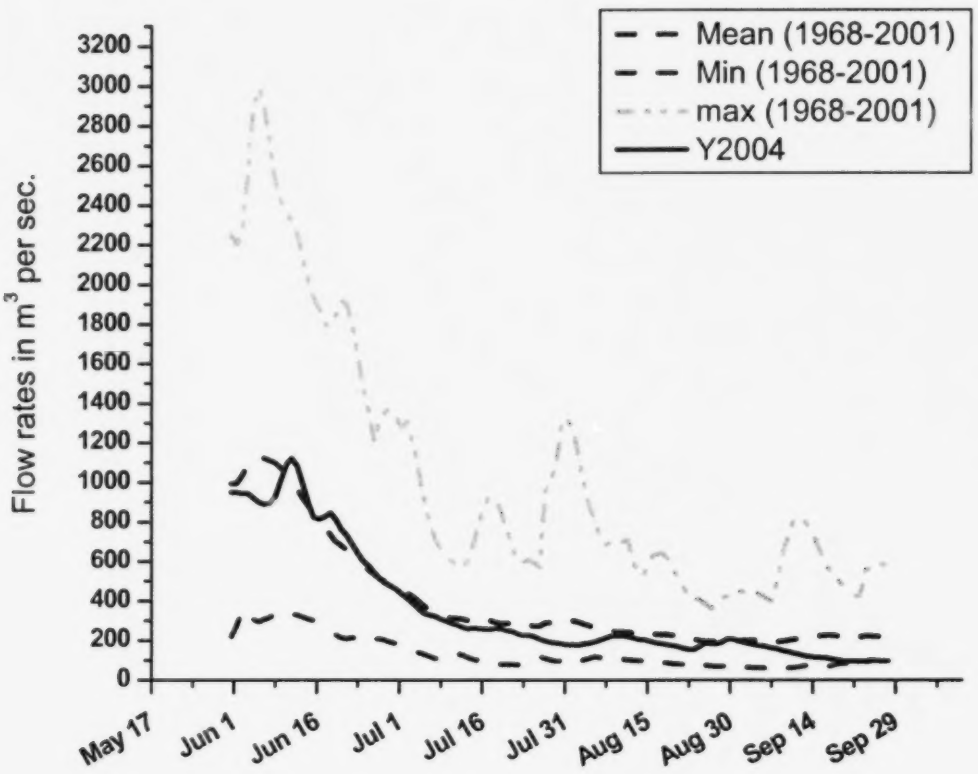

Figure 3. Flow rates for Eagle River indicating mean flows for 1968-2001, minimum and maximum flow for 1968-2001 with a comparison to the flow rates in 2004.

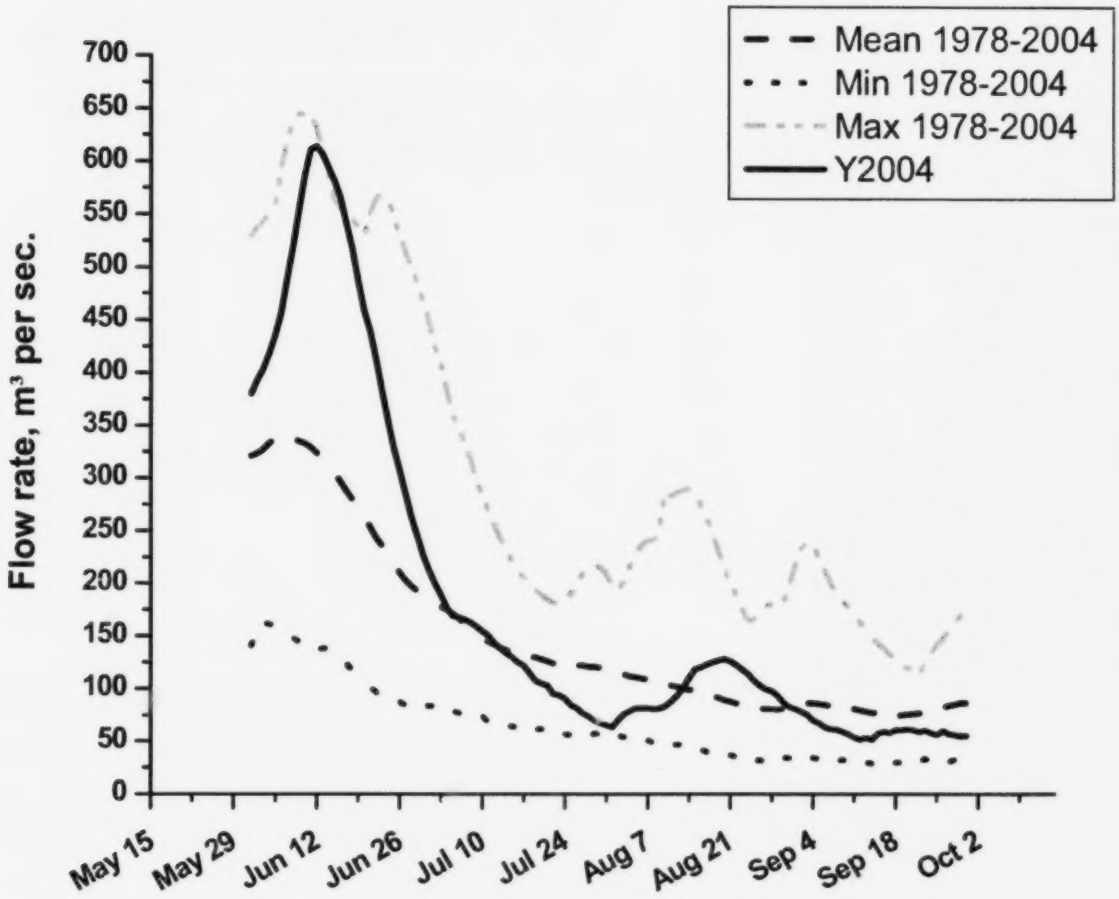

Figure 4. Flow rates for Naskaupi River indicating mean flows for 1978-2004, minimum and maximum flow for 1978-2004 with a comparison to the flow rates in 2004.

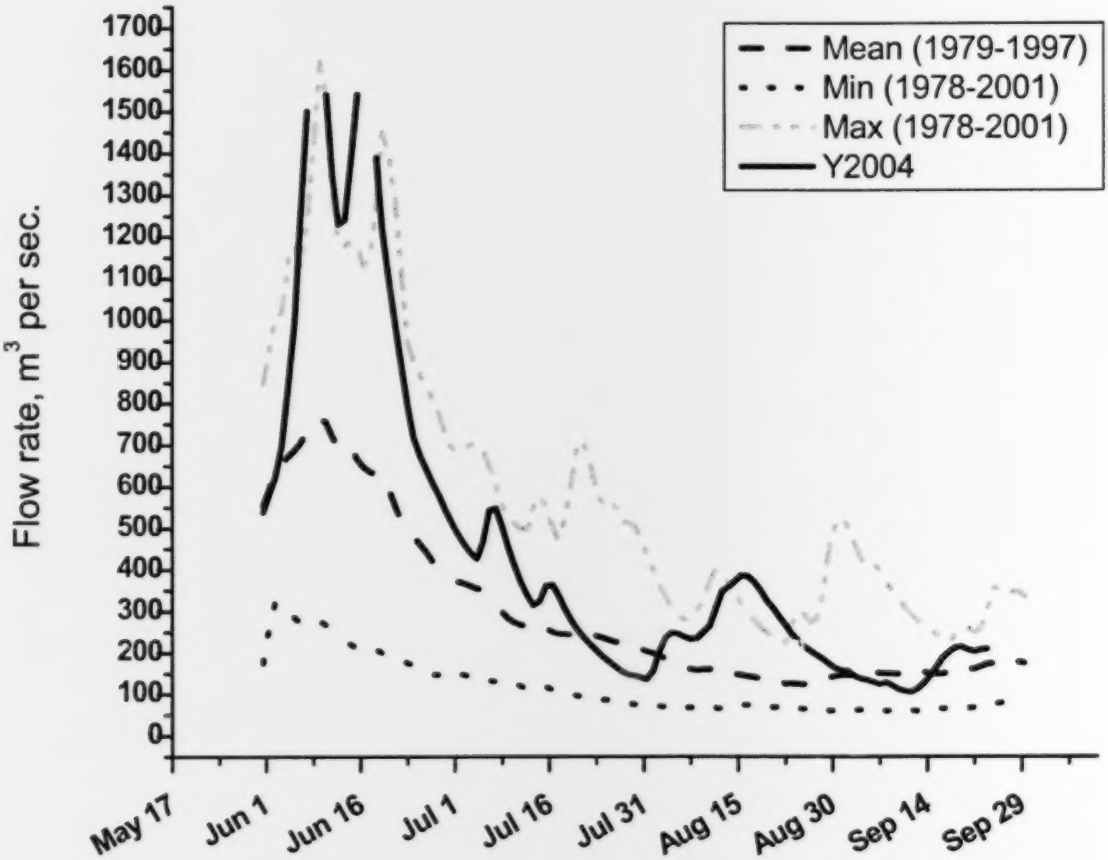

Figure 5. Flow rates for Ugjoktok River indicating mean flows for 1979-97, minimum and maximum flow for 1978-2001 with a comparison to the flow rates in 2004.